WHAT IS CLAIMED IS:

1. An apparatus for controlling the temperature of an electronic device, said apparatus comprising:

a refrigeration system including a compressor, said refrigeration system being operative to circulate a refrigerant through a fluid flow loop such that said refrigerant will change between gaseous and liquid states so as to alternately absorb and release thermal energy;

a thermal head having a temperature controlled surface, said thermal head defining a flow channel for passage of said refrigerant to thereby function as an evaporator in said refrigeration system;

a heat exchanger located between said thermal head and said compressor in said fluid flow loop, said heat exchanger defining a supply channel to introduce said refrigerant into said thermal head, a return channel for receiving refrigerant exiting said thermal head and a pre-cooling channel adapted to receive said refrigerant from said compressor and exhaust said refrigerant to said return channel;

a control valve located between said heat exchanger and said thermal head in said fluid flow loop, said control valve being operative to regulate introduction of said refrigerant into said flow channel of said thermal head; and

a controller operative to control said control valve for maintaining a predetermined temperature at said temperature controlled surface.

2. The apparatus as recited in claim 1, wherein said control valve is a pulsing valve operated by a pulse width modulated (PWM) signal.

3. The apparatus as recited in claim 1, wherein said control valve is adapted to be proportionally controlled by a mechanically variable restriction.

4. The apparatus as recited in claim 1, wherein said control valve is adapted to be proportionally controlled by an electrically variable restriction.

5. The apparatus as recited in claim 1, wherein said heat exchanger and said thermal head are in close physical proximity.

6. The apparatus as recited in claim 1, further comprising a bypass restriction adapted to divert said refrigerant exiting said heat exchanger towards said control valve to said return channel.

7. The apparatus as recited in claim 6, wherein said bypass restriction being located downstream of said heat exchanger.

8. The apparatus as recited in claim 6, wherein said bypass restriction is a bypass flow valve that can be switched based upon a control signal.

9. The apparatus as recited in claim 8, wherein said bypass flow valve is capable of being switched in a complementary manner with respect to said control valve such that said refrigerant flows either through said thermal head or said bypass flow valve.

10. The apparatus as recited in claim 8, wherein said bypass flow valve is capable of being

switched to divert said refrigerant when said thermal head reaches a selected temperature.

11. The apparatus as recited in claim 8, wherein said bypass flow valve controls said refrigerant from entering said thermal head by varying the effective restriction of said bypass flow valve.

12. The apparatus as recited in claim 11, wherein said bypass flow valve is a pulsing valve operated by a pulse width modulated (PWM) signal.

13. The apparatus as recited in claim 11, wherein said bypass flow valve is a proportional valve.

14. The apparatus as recited in claim 8, further comprising a stabilizing block located between said heat exchanger and said thermal head, said stabilizing block adapted to dampen temperature variations of said refrigerant exiting said supply channel.

15. The apparatus as recited in claim 8, further comprising a stabilizing block located between said heat exchanger and said thermal head, said stabilizing block adapted to dampen temperature variations of said refrigerant entering said return channel.

16. The apparatus as recited in claim 8, further comprising means for selectively diverting said refrigerant exiting said thermal head directly to said compressor.

17. The apparatus as recited in claim 16, further comprising an array of hot head bypass valves arranged in fluid communication at multiple points along said return channel, said diverting

means adapted to introduce said refrigerant to a selected point along said return channel based upon the temperature of said refrigerant exiting said thermal head.

18. An apparatus for controlling the temperature of an electronic device, said apparatus comprising:

a refrigeration system including a compressor, said refrigeration system being operative to circulate a refrigerant through a fluid flow loop such that said refrigerant will change between gaseous and liquid states so as to alternately absorb and release thermal energy;

at least two thermal heads with each having a temperature controlled surface, each of said thermal heads defining a flow channel for passage of said refrigerant;

a heat exchanger located between each of said thermal heads and said compressor in said fluid flow loop, said heat exchanger defining a supply channel to introduce said refrigerant into each of said thermal heads, a return channel for receiving refrigerant exiting each of said thermal heads and a pre-cooling channel adapted to receive said refrigerant from said compressor and exhaust said refrigerant to said return channel;

a control valve located between said heat exchanger and each of said thermal heads in said fluid flow loop, said control valve being operative to regulate introduction of said refrigerant into said flow channel of each of said thermal heads;

a controller operative to control said control valve for maintaining a predetermined temperature

at said temperature controlled surface of each of said thermal heads; and

a flow balance heater located in the flow loop between each of said thermal heads and said compressor for selectively increasing the thermal load.

19. The apparatus as recited in claim 18, wherein said flow balance heater control is located in the flow loop between each of said thermal heads and said heat exchanger.

20. A method of maintaining multiple electronic devices at a predetermined temperature, said method comprising the steps of:

(a) providing a refrigeration system having a compressor with multiple associated heat exchangers and thermal heads, each of said thermal heads including a temperature controlled surface in thermal contact with an electronic device;

(b) provided a flow balance heater control associated with each of said heat exchangers; and

(c) if the temperature of a heat exchanger falls below a selected temperature, activating said flow balance heater control to provide an additional thermal load on said heat exchanger.